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PTO/SB/08A (10-96)

App. 1 for use through 10/31/99. OMB 0651-0031
U.S. DEPARTMENT OF COMMERCE

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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DEC 21 2001

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U.S. PATENT DOCUMENTS

Examiner Initials ¹	Cite No. ¹	U.S. Patent Document		Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number	Kind Code ² (if known)			
J. T. Mangold [initials]	6,089,311			Edelson. J.S.	07-18-00	
	2,510,397			Hansell. C.W.	06-06-50	
	2,915,652			Hatsopoulos. G.N.	12-01-59	
	3,021,472			Hernqvist. K.G.	02-13-62	
	3,118,107			Gabor. D.	01-14-64	
	3,169,200			Huffman. F.N.	02-09-65	
	3,173,032			Maynard. J.T.	03-09-65	
	3,238,395			Sense. K.A.	03-01-66	
	3,239,745			Hernqvist. K.G.	03-08-66	
	3,267,307			Fox. R.	08-16-66	
	3,267,308			Hernqvist. K.G.	08-16-66	
	3,281,372			Haas. G.A.	10-25-66	
	3,300,660			Bensimon. J.	01-24-67	
	3,328,611			Davis. E.D.	06-27-67	
	3,376,437			Meyerand, Jr. R.G.	04-02-68	
K. T. Mangold [initials]	3,393,330			Vary. A.	07-16-68	
	3,470,393			Moncorge. G.	09-30-69	
	3,515,908			Caldwell. F.	06-02-70	
	3,519,854			Davis. E.D.	07-07-70	
	3,578,992			Shimada. K.	05-18-71	

FOREIGN PATENT DOCUMENTS

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6/24/02

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Application Number	09/481,803
Filing Date	08/31/1998
First Named Inventor	TAVKHELIDZE, Avto
Group Art Unit	2834
Examiner Name	TAMAI, K
Attorney Docket Number	

U.S. PATENT DOCUMENTS

Examiner Initials ¹	Cite No. ¹	U.S. Patent Document		Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number	Kind Code ² (if known)			
		4,004,210		Yater. J.C.	01-18-77	
		4,039,352		Marinescu. M.	08-02-77	
		4,410,951		Nakamura. T.	10-18-83	
		4,423,347		Kleinschmidt. P.	12-27-83	
		4,958,201		Mimura. T.	09-18-90	
		5,028,835		Fitzpatrick. G.O.	07-02-91	
		5,049,775		Smits. J.	09-17-91	
		5,119,151		Onda. K.	01-02-92	
		5,229,320		Ugajin. R.	07-20-93	
		5,233,205		Usagawa. T.	08-03-93	
		5,247,223		Mori. Y.	09-21-93	
		5,332,952		Ugajin. R.	07-26-94	
		5,351,412		Furuhat. T.	10-04-94	
		5,356,484		Yater. J.C.	10-18-94	
		5,371,388		Oda. H.	12-06-94	
		5,521,735		Shimizu. A.	05-28-96	
		5,675,972		Edelson. J.S.	10-14-97	
		5,699,668		Cox. I.W.	12-23-97	
		5,722,242		Edelson. J.S.	03-03-98	
		5,810,980		Edelson. J.S.	09-22-98	

FOREIGN PATENT DOCUMENTS

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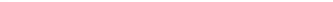
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<p>Substitute for form 1449A/PTO</p> <p>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</p> <p><i>(use as many sheets as necessary)</i></p> <p>Sheet 3 of 4</p>				<p>Complete if Known</p> <table border="1"> <tr> <td>Application Number</td> <td>09/481,803</td> </tr> <tr> <td>Filing Date</td> <td>08/31/1998</td> </tr> <tr> <td>First Named Inventor</td> <td>TAVKHELIDZE, Avto</td> </tr> <tr> <td>Group Art Unit</td> <td>2834</td> </tr> <tr> <td>Examiner Name</td> <td>TAMAI, K</td> </tr> <tr> <td>Attorney Docket Number</td> <td></td> </tr> </table>	Application Number	09/481,803	Filing Date	08/31/1998	First Named Inventor	TAVKHELIDZE, Avto	Group Art Unit	2834	Examiner Name	TAMAI, K	Attorney Docket Number	
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Examiner Signature		Date Considered	6/29/02
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Sheet 4 of 4

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Filing Date	08/31/1998
First Named Inventor	TAVKHELIDZE, Avto
Group Art Unit	2834
Examiner Name	TAMAI, K

Attorney Docket Number

OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T2
DA	✓ 1	FITZPATRICK, G.O. et al. "Close-Spaced Thermionic Converters with Active Spacing Control and Heat Pipe Isothermal Emitters." IEEE. Vol 2: 920-927 (1996)	
WA	✓ 2	FITZPATRICK, G.O. et al. "Demonstration of Close-Spaced Thermionic Converters." Abs. Papers. Am. Chem. Soc. 93355: 1.573-1.580 (1993)	
WA	✓ 3	MAHAN, G.D. "Thermionic Refrigeration." J. Appl. Phys 76: 4362-4368 (1994)	
WT	✓ 4	HUFFMAN, F.N. et al. "Preliminary Investigation of a Thermotunnel Converter." I.E.C.E.C. vol 1: 573-579 (1988)	
WT	✓ 5	HOUSTON, J.M. "Theoretical Efficiency of the Thermionic Energy Converter." J. Appl. Phys. 30: 481-487 (1959)	
WT	✓ 6	KING, D.B. et al. "Results from the Microminiature Thermionic Converter Demonstration Testing Program." Am. Inst. of Phys. 1-56396-846: 1432-1436 (1999)	
KJ	✓ 7	ZENG, T and CHEN, G. "Hot Electron Effects on Thermionic Emission Cooling in Heterostructures." Mat. Res. Soc. 545: 467-472 (1999)	
WT	✓ 8	SHAKOURI, A. et al. "Enhanced Thermionic Emission Cooling in High Barrier Superlattice Heterostructures." Mat. Res. Soc. 545: 449-458 (1999)	
WT	✓ 9	FUKUDA, R. et al. "Development of the Oxygenated Thermionic Energy Converters Utilizing the Sputtered Metal Oxides as a Collector." Am. Inst. Phys. 1444-1451 (1999)	
WT	✓ P	SVENSSON, R. and HOLMLID, L. "TEC as Electric Generator in an Automobile Catalytic Converter." IEEE. Vol 2: 941-944 (1996)	

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